Green bus for Youth Olympic Village

Hydrogen-electric hybrid bus to be used to ferry participants around the NTU campus

BY GRACE CHUA

ATHLETES in town for the Youth Olympic Games (YOG) next month will ride around the Olympic Village in Singapore’s latest green vehicle: a hydrogen-electric hybrid bus.

The bus, developed by engineers from the Nanyang Technological University (NTU) and China’s Tsinghua University, will be used to ferry participants along the steep slopes of the NTU campus, where the Youth Olympic Village is situated.

The 72-passenger, single-deck vehicle is likely to be Singapore’s first fuel-cell vehicle in practical use, though a Singapore team in last year’s Shell Eco-marathon car race in Germany drove a hydrogen fuel-cell car 484km on a single litre of fuel.

The bus has eight hydrogen tanks on its roof, which hold about 128kg of pressurised hydrogen; the fuel is channelled into fuel cells, which split the hydrogen into charged particles. Those charged particles then flow through a circuit to generate a current, which supplies power for the vehicle.

That current also charges a lithium-ion battery, like those used in electric or ordinary hybrid cars.

By using hydrogen, the bus emits no carbon dioxide, or sulphur dioxide, which contributes to acid rain. In comparison, a normal diesel bus produces 1.39kg of carbon dioxide per kilometre.

By using a battery as well as a fuel-cell stack, the bus needs fewer fuel cells, slashing running costs.

The project’s funding of about $225,000 comes from the Land Transport Authority’s Innovation Fund, a $50 million kitty for transport development. NTU electrical engineer Soh Yeng Chai said the project was first mooted about two years ago, when the university was designated the Olympic Village. It is part of NTU’s clean-energy research programmes, which include fuel-cell research, Professor Soh said.

During the YOG, the bus will run modest trips – a total of 80km a day, four days a week. After the Games, it will be used to shuttle between NTU and a transit interchange. Details have not been finalised.

But the main challenges to fuel-cell vehicles becoming mainstream here include the high cost of fuel cells, their short two-year lifespan, and their performance, Prof Soh said.

He did not give a cost estimate, but producing power from fuel cells costs $4,000 per kilowatt-hour, by some estimates. In comparison, electricity from natural gas typically costs a fraction of that, at a few cents per kWh.

Among other fuel-cell applications being planned here: developer JTC will install hydrogen power for a building at its upcoming CleanTech Park near NTU.

Internationally, other fuel-cell vehicles being developed include Toyota’s fuel-cell hybrid car and bus, and Honda’s FCX Clarity, a fuel-cell car already available for lease in the United States.

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